

221201US-2-PCT

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
BERTRAND LEVERRIER ET AL. : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT/FR01/02567)
FILED: HEREWITH : EXAMINER:
FOR: MICRO-MACHINED SENSOR :
WITH INSULATOR PROTECTION
FOR THE CONNECTIONS

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE SPECIFICATION

Please amend the specification as follows:¹

Please replace the paragraph at page 3, line 33, to page 4, line 7, as follows:

On the diaphragm 16, electronic elements 18 needed to detect the deformations of this diaphragm are formed by means of microelectronic manufacturing methods. In one example, these elements are strain gauges directly formed in the silicon (by the implantation of appropriate dopants in the silicon) or formed in a silicon layer separated from the silicon substrate by an insulating layer (this is the silicon-on-insulator structure). For very harsh

¹A marked-up copy of the amendments is attached hereto.

environments, these gauges may be made on the diaphragm inside the cavity 14. If the environment is less difficult, they may be formed outside the cavity 14. The gauges are sensitive to the deformations of the diaphragm prompted by the pressure variations to be measured.

Please replace the paragraph at page 4, lines 25-31, as follows:

The base may be an insulator or conductive base, but in the latter case it must be planned that an insulator 33 (for example made of glass in the case of a metal base) will fill the passages into which the pins are inserted, in order to electrically insulate the pins from one another. In one embodiment, the base is a metal alloy such as Kovar, with glass-lined via holes. It could be made of insulating ceramic or even plastic for environments at moderate temperatures.

Please replace the paragraph at page 5, lines 25-28, as follows:

An electroless deposit is also possible. In this case, the electrolysis occurs by simple chemical reaction between the pins or connection pads and the ion solution of the electrolytic bath, without the application of external potential differences.

IN THE CLAIMS

Please cancel original Claims 1-7 without prejudice.

Please add new Claims 8-14 as follows:

8. (New) Method for making a sensor of physical quantities comprising:

preparing an active sensor part and a base, the active part comprising at least one wafer provided with conductive connection pads on a first face and the base provided with conductive pins;

electrically connecting the pads and the pins by conductive elements;

plunging the wafer and ends of the pins into an electrolytic bath;
performing an electrolytic deposition of at least one conductive metal on the pin ends,
the connection pads, and the conductive elements that connect them; and
performing an oxidizing or nitriding operation on this metal to make an insulating coat
on the connection pads, the pin ends, and the conductive elements that connect them.

9. (New) Method according to claim 8, wherein the electrolytic deposition is
obtained by migration of metal ions coming from a liquid solution, with passage of electrical
current into the solution.

10. (New) Method according to claim 8, wherein the electrolytic deposition is an
electroless deposition carried out by migration of metal ions coming from a liquid solution,
without passage of electrical current.

11. (New) Method according to claim 8, wherein the electrolytically deposited
conductive metal one of nickel, tantalum, or tungsten or molybdenum.

12. (New) Method according to claim 8, wherein the pins and the connection pads
are connected by bonded wires.

13. (New) Method according to claim 8, wherein the conductive elements that
connect the pads electrically and mechanically to the pins includes an electrolytic metal
deposit.

14. (New) Sensor of physical quantities obtained by the method of claim 8, wherein
the sensor constitutes a sensor of pressure, stresses, acceleration, temperature, gas or liquid.

IN THE ABSTRACT

Please cancel the original Abstract on page 9 in its entirety and insert therefor:

ABSTRACT OF THE DISCLOSURE

Sensors of physical quantities such as pressure or acceleration sensors and, more specifically, to the mounting of the active part of the sensor on a base bearing connection pins. An active part of the sensor is prepared. This active part is formed, for example, by micro-machined silicon wafers bearing electronic elements, electrical conductors, and connection pads. A base is thus prepared, provided with pins, and the pads are electrically connected to the pin ends by conductive elements. Then the wafer and the pin ends are plunged into an electrolytic bath to make an electrolytic deposit of conductive metal on the pin ends, the pads, and the conductive elements that connect them. Finally, this metal is oxidized or nitrized to constitute an insulating coat on the pin ends, the pads, and the conductive elements that connect them. Such a sensor may find particular application to a sensor of pressure, stresses, acceleration, etc., designed to work in harsh environments.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present preliminary amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present preliminary amendment the specification is amended to correct for minor informalities.

Further, original Claims 1-7 are cancelled and new Claims 8-14 are presented for examination. New Claims 8-14 are deemed to be self-evident from the original disclosure, including original Claims 1-7, and thus are not deemed to raise any issues of new matter. Further, new Claims 8-14 are not believed to be more narrow in scope in any aspect in

comparison with original Claims 1-7, and in certain aspects new Claims 8-14 are in fact broader. As one example new independent Claim 8 no longer recites the term "consisting of" but instead recites the broader term "comprising".

A new Abstract believed to be in more proper format under United States practice is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

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